<u>What is claimed is:</u>

1.   A wide-band speech coder comprising:

a speech characteristic classification unit, which stipulates a characteristic of speech corresponding to a current frame statistically using an open-circuit pitch value and a linear prediction coefficient in which a wide-code speech signal to be coded is perceptual weigh filtered;

an adaptive codebook retrieving unit, which retrieves a pitch delay value around the open-circuit pitch value, calculates a pitch gain value, generates an adaptive codebook contribution signal corresponding to the retrieved pitch delay value, and outputs a difference between the generated adaptive codebook contribution signal and the perceptual weigh filtered signal as a first fixed codebook target signal;

a first fixed codebook retrieving unit, which obtains a first fixed codebook index that can express the first fixed codebook target signal most properly, and a first fixed codebook gain value, generates a first fixed codebook contribution signal corresponding to the retrieved index, and outputs a difference between the first generated fixed codebook contribution signal and the first fixed codebook target signal as a second fixed codebook target signal;

a second fixed codebook retrieving unit, which includes at least two second fixed codebooks according to a speech characteristic, selects a second fixed codebook according to the speech characteristic, and retrieves second fixed codebook indices that can express the second fixed codebook target signal most properly, and second fixed codebook gain values; and

a parameter multiplexer, which quantizes and multiplexes the speech characteristic information, the pitch delay value, the pitch gain value, the first fixed codebook index, the first fixed codebook gain value, the second fixed codebook indices, and the second fixed codebook gain values, makes them as a bit stream, and transmits the bit stream to an external speech decoding terminal.

2.   The wide-band speech coder of claim 1, wherein the second fixed

codebook is composed of an algebraic codebook and a random codebook, and the second fixed codebook retrieving unit retrieves the random codebook in fricative sound or affricate section and retrieves the algebraic codebook in other sections.

3. The wide-band speech coder of claim 1, wherein the second fixed codebook is composed of an algebraic codebook and a random codebook, and the second fixed codebook retrieving unit retrieves the random codebook in an unvoiced sound section and retrieves the algebraic codebook in a voiced sound section.

4. The wide-band speech coder of claim 1, wherein the second fixed codebook gain values include all gain values of each of the second fixed codebooks.

5. The wide-band speech coder of claim 1, wherein the second fixed codebook gain values include a second standardized fixed codebook gain value and the ratio of the second standardized fixed codebook gain value and gain values of other second fixed codebooks.

6. A wide-band speech coding method comprising:

(a) stipulating a characteristic of speech corresponding to a current frame statistically using an open-circuit pitch value and a linear prediction coefficient in which a wide-code speech signal to be coded is perceptual weigh filtered;

(b) obtaining a pitch delay value around the open-circuit pitch value and a pitch gain value and generating a difference between an adaptive codebook contribution signal corresponding to the obtained pitch delay value and the perceptual weigh filtered signal as a first fixed codebook target signal;

(c) obtaining a first fixed codebook index that can express the first fixed codebook target signal most properly, and a first fixed codebook gain value and generating a difference between a first fixed codebook contribution signal generated using the first obtained fixed codebook index and the first fixed codebook gain value and the first fixed codebook target signal as a second fixed codebook target signal;

(d) selecting and retrieving a second fixed codebook retrieving unit from a plurality of second fixed codebooks classified according to a speech characteristic, according to speech characteristic information and retrieving second fixed codebook

13

indices that can express the second fixed codebook target signal most properly, and second fixed codebook gain values; and

(e) quantizing and multiplexing the speech characteristic information, the pitch delay value, the pitch gain value, the first fixed codebook index, the first fixed codebook gain value, the second fixed codebook indices, and the second fixed codebook gain values, making them as a bit stream, and transmitting the bit stream to an external speech decoding terminal.

7. The wide-band speech coding method of claim 6, wherein the second fixed codebook in step (d) is composed of an algebraic codebook and a random codebook, and in fricative sound or affricate section, the random codebook is retrieved, and in other sections, the algebraic codebook is retrieved, such that the second fixed codebook indices and the second fixed codebook gain values are obtained.

8. The wide-band speech coding method of claim 6, wherein the second fixed codebook in step (d) is composed of an algebraic codebook and a random codebook, and in an unvoiced sound section, the random codebook is retrieved, and in a voice sound section, the algebraic codebook is retrieved, such that the second fixed codebook indices and the second fixed codebook gain values are obtained.

9. The wide-band speech coding method of claim 6, wherein the second fixed codebook gain values include all gain values of each of the second fixed codebooks.

10. The wide-band speech coding method of claim 6, wherein the second fixed codebook gain values include a second standardized fixed codebook gain value and the ratio of the second standardized fixed codebook gain value and gain values of other second fixed codebooks.

11. A wide-band speech decoder comprising:
a parameter demultiplexer, which demultiplexes a bit stream transmitted from an external wide-band speech coder, including parameters, such as

14

speech characteristic information, an adaptive codebook pitch delay value, an adaptive codebook pitch gain value, a first fixed codebook index, a first fixed codebook gain value, second fixed codebook indices, and second fixed codebook gain values and restores the parameters;

5   an adaptive code vector generator, which obtains an adaptive code vector corresponding to the adaptive codebook pitch delay value and the adaptive codebook pitch gain value;

a first fixed code vector generator, which obtains a first fixed code vector corresponding to the first fixed codebook index and the first fixed codebook gain

10   value;

a second fixed code vector generator, which selects a second fixed codebook from a plurality of second fixed codebooks using the speech characteristic information and obtains a second fixed code vector corresponding to the second fixed codebook index and the second fixed codebook gain value;

15   an adder, which adds the adaptive code vector and the first and second fixed code vectors to one another and generates an excitation signal, and

wherein the excitation signal is linear prediction synthesis filter processed and post-processing filter processed and is generated as a speech synthesis signal.

20   ·   12.   A wide-band speech decoding method comprising:

(a) reverse multiplexing a bit stream transmitted from an external wide-band speech coder, including parameters, such as speech characteristic information, an adaptive codebook pitch delay value, an adaptive codebook pitch gain value, a first fixed codebook index, a first fixed codebook gain value, second fixed codebook

25   indices, and second fixed codebook gain values and restores the parameters;

(b) retrieving an adaptive codebook and obtaining an adaptive code vector corresponding to the adaptive codebook pitch delay value and the adaptive codebook pitch gain value;

(c) retrieving a first fixed codebook and obtaining a first fixed code vector

30   corresponding to the first fixed codebook index and the first fixed codebook gain value;

(d) selecting and retrieving a second fixed codebook from a plurality of second fixed codebooks using the speech characteristic information and obtaining a second

15

fixed code vector corresponding to the second fixed codebook index and the second fixed codebook gain value;

(e) adding the adaptive code vector and the first and second fixed code vectors to one another and generating an excitation signal; and

5   (f) linear prediction synthesis filter processing and post-processing filter processed the excitation signal and generating the excitation signal as a speech synthesis signal.